

AMENDMENTS TO THE CLAIMS

Applicant cancels Claims 1 – 50, without prejudice or disclaimer, and adds New Claims 51 – 91. The following listing of claims replaces all prior versions and listings of claims in the application.

1 - 50 (cancelled)

51. (new) An elastomeric gasket adapted to seal a flow field plate, a gas diffusion layer, and an ion-exchange polymer membrane in a fuel cell stack, said gasket comprising:

a carrier member having a first side and second side, wherein said first and second sides provide opposite sides in said carrier member;

an elastomeric member of reaction-cured elastomer, said elastomeric member bonded to said first side of said carrier member with a reaction-cured bond formed during reaction curing of said elastomer, said elastomeric member having a base portion and a sealing portion projecting above said base portion, wherein said sealing portion is disposed for compression against said flow field plate; and

a pressure sensitive adhesive layer bonded to said second side, said adhesive layer derived from adhesive bonded to said carrier member prior to said reaction curing, wherein said adhesive layer is disposed to seal under compressive force against said ion-exchange polymer membrane.

52. (new) The gasket of Claim 51 wherein said elastomeric member is reaction-cured from an elastomeric precursor selected from the group consisting of EPDM, polyacrylate, fluorocarbon, silicone, epichlorohydrin, fluorosilicone, fluoropolymer, butyl, nitrile, hydrogenated nitrile, thermoplastic elastomer, and thermoplastic vulcanizate elastomeric precursors.

53. (new) The gasket of Claim 51 wherein said gasket has a general internal periphery and said base portion has an upper surface at a height H_1 above said first side, said gasket further comprising a tab portion connected to said gasket and extending inboard of said internal periphery, said tab portion having a first tab side and second tab side wherein said first and second tab sides provide opposite sides of said tab, said first tab side essentially coplanar with said base portion upper surface, wherein said first tab side is disposed to supportively press against said gas diffusion layer.

54. (new) The gasket of Claim 52 wherein said sealing portion has a sealing bead, said sealing bead has an apex above said base, said apex has a height H_2 between said apex and said base, and said sealing bead is compressible into said base portion such that, under compression, height H_2 diminishes to a zero value.

55. (new) The gasket of Claim 51 wherein said carrier member comprises a polymeric material selected from the group consisting of polyester polymer, polybutylene terephthalate polymer, polyethylene naphthalate polymer, polyethylene terephthalate polymer, and polyamide polymer having recurrent amide groups.

56. (new) The gasket of Claim 51 wherein said carrier member comprises a polymeric material selected from the group consisting of polyamide polymer, silicone polymer, polyimide polymer, and polyethersulphone polymer.

57. (new) The gasket of Claim 51 wherein said carrier member comprises a metallic material selected from the group consisting of steel, brass, aluminum, magnesium, and stainless steel.

58. (new) The gasket of Claim 51 wherein said carrier member is any of a plastic plate, a graphite plate, a fiber board, a woven fabric, rubber coated metal, and a ceramic layer.

59. (new) The gasket of Claim 51 wherein said carrier member has a thickness of less than 1.0mm between said first and second sides.

60. (new) The gasket of Claim 51 wherein said carrier member has a thickness from about 0.005mm to about 0.95mm between said first and second sides.

61. (new) A gasket assembly adapted to seal a fuel cell, the fuel cell comprising a pair of flow field plates and a pair of gas diffusion layers, said gasket assembly comprising:

a first carrier member having a first carrier member first side, a first carrier member second side, and a first general internal periphery wherein said first and second sides provide opposite sides in said first carrier member;

a first elastomeric member of reaction-cured elastomer, said first elastomeric member bonded to said first carrier member first side with a reaction-cured bond formed during reaction curing of said elastomer, said elastomeric member having a base portion and a sealing portion projecting above said base portion, wherein said sealing portion is disposed for compression against one flow field plate of said flow field plate pair, said base portion having an upper surface at a first height above said first carrier member first side, said first elastomeric member further comprising a first elastomeric member tab portion connected to said first elastomeric member and extending inboard of said first internal periphery, said first elastomeric member tab portion having a first tab side and second tab side wherein said first and second tab sides provide opposite sides of said first elastomeric member tab, said first tab side essentially coplanar with said first elastomeric member base portion upper surface, wherein said first tab side is disposed to supportively press against one gas diffusion layer of said gas diffusion layer pair;

an ion-exchange polymer membrane adhesively bonded to said first carrier member second side, said ion-exchange polymer membrane having an ion-exchange membrane first side and an ion-exchange membrane second side, wherein said first

and second sides provide opposite sides in said ion-exchange polymer membrane and wherein said ion-exchange membrane first side is adhesively bonded to said first carrier member second side;

a second carrier member adhesively bonded to said ion-exchange polymer membrane second side, said second carrier member having a second carrier member first side, a second carrier member second side, and a second general internal periphery wherein said first and second sides provide opposite sides in said second carrier member, and said second carrier member second side is bonded to said ion-exchange polymer membrane; and

a second elastomeric member of reaction-cured elastomer, said second elastomeric member bonded to said second carrier member first side with a reaction-cured bond formed during reaction curing of said elastomer, said elastomeric member having a base portion and a sealing portion projecting above said base portion, wherein said sealing portion is disposed for compression against the other flow field plate of said flow field plate pair, said base portion having an upper surface at a second height above said second carrier member first side, said second elastomeric member further comprising a second elastomeric member tab portion connected to said second elastomeric member and extending inboard of said second internal periphery, said second elastomeric member tab portion having a first tab side and second tab side wherein said first and second tab sides provide opposite sides of said second elastomeric member tab, said first tab side essentially coplanar with said second elastomeric member base portion upper surface, wherein said first tab side is disposed

to supportively press against the other gas diffusion layer of said gas diffusion layer pair.

62. (new) The gasket assembly of Claim 61 wherein said first tab portion has a mechanically engaging exterior shape selected from the group consisting of a partial square shape, a partial triangle shape, a partial arcuate shape, and a partial polygonal shape.

63. (new) - The gasket assembly of Claim 61 wherein at least one said carrier member has a web portion interposed between its respective said first and second carrier member sides.

64. (new) The gasket assembly of Claim 61 wherein at least one said sealing portion has a sealing bead, said sealing bead has an apex, said apex has a height H_2 between said apex and said base, and said sealing bead is compressible into said base portion such that, under compression, height H_2 diminishes to a zero value.

65. (new) The gasket assembly of Claim 61 wherein at least one tab portion adhesively bonds to its respective gas diffusion layer.

66. (new) The gasket assembly of Claim 61 wherein each said carrier member comprises a polymeric material selected from the group consisting of polyester polymer, polybutylene terephthalate polymer, polyethylene naphthalate polymer, polyethylene terephthalate polymer, and polyamide polymer having recurrent amide groups.

67. (new) The gasket assembly of Claim 61 wherein each said carrier member comprises a polymeric material selected from the group consisting of polyester polymer, polyamide polymer, silicone polymer, polyimide polymer, and polyethersulphone polymer.

68. (new) The gasket assembly of Claim 61 wherein each said carrier member has a thickness from about 0.005mm to about 0.95mm.

69. (new) The gasket assembly of Claim 64 wherein each said sealing bead has a shape factor from about 0.1 to about 100.

70. (new) A gasket adapted for sealing a joint between a first member and a second member, said gasket comprising;

a carrier member having a first side and second side, wherein said first and second sides provide opposite sides in said carrier member, said carrier member having a thickness between said first and second sides of from about 0.03mm to about 0.95mm;

an elastomeric member of reaction-cured elastomer, said elastomeric member bonded to said first side of said carrier member with a reaction-cured bond formed during reaction curing of said elastomer, wherein said elastomeric member is disposed for conformable compression against said first member; and

an adhesive layer bonded to said second side, said adhesive layer derived from adhesive bonded to said carrier member prior to said reaction curing, wherein said adhesive layer is disposed to conformably seal under compressive force against said second member.

71. (new) The gasket of Claim 70 wherein said elastomeric member has a base portion and a sealing portion projecting above said base portion, said sealing portion is disposed for compression against said first member, and said sealing portion has a sealing bead of a shape selected from the group consisting of a triangle shape, a rectangular shape, a square shape, a polygonal shape, a semi-elliptical shape, an oval shape, a semi-round shape, and a truncated triangle shape.

72. (new) The gasket of Claim 70 wherein said carrier member comprises a polymeric material selected from the group consisting of polyester polymer, polybutylene terephthalate polymer, polyethylene naphthalate polymer, polyethylene terephthalate polymer, and polyamide polymer having recurrent amide groups.

73. (new) The gasket of Claim 70 wherein said carrier member comprises a polymeric material selected from the group consisting of polyester polymer, polyamide polymer, silicone polymer, polyimide polymer, and polyethersulphone polymer.

74. (new) The gasket of Claim 70 wherein said carrier member comprises a metallic material selected from the group consisting of steel, brass, aluminum, magnesium, and stainless steel.

75. (new) The gasket of Claim 70 wherein said gasket has a general internal periphery and said base portion has an upper surface at a height H_1 above said first side, said gasket further comprising a tab portion connected to said gasket and extending inboard of said internal periphery, said tab portion having a first tab side and second tab side wherein said first and second tab sides provide opposite sides of said tab, said first tab side essentially coplanar with said base portion upper surface.

76. (new) The gasket of Claim 70 wherein said carrier member is any of a plastic plate, a graphite plate, a fiber board, a woven fabric, rubber coated metal, and a ceramic layer.

77. (new) The gasket of Claim 70 wherein said elastomeric member has a base portion and a sealing portion projecting above said base portion, said sealing portion is disposed for compression against said first member, and said sealing portion has a sealing bead with an apex, said apex disposed to bear against said first member and form thereby a seal between said first member and said apex without compressing sufficiently to enable said first member to bear in direct compression against said base portion, wherein said seal prevents migration of fluid through said seal.

78. (new) The gasket of Claim 75 wherein at least one of said tab sides has a mechanical engagement portion and an adhesive engagement portion.

79. (new) The gasket of Claim 77 wherein said elastomeric member base portion has a shape factor from about 0.1 to about 100.

80. (new) The gasket of Claim 78 wherein said mechanical engagement portion has a shape selected from a group consisting of a partial square shape, a partial triangle shape, a partial arcuate shape, and a partial polygonal shape.

81. (new) The gasket of Claim 77 wherein said sealing bead has a shape factor from about 0.15 to about 10.

82. (new) The gasket of Claim 77 wherein said apex is disposed for compression into said base portion to up to 100% of the height of said apex above said base portion.

83. (new) The gasket of Claim 82 wherein said apex is compressed by 100% of said height to form a compression limiter, said compression limiter having a shape factor from about 0.1 to about 100.

84. (new) The gasket of Claim 82 wherein said shape factor is from about 0.15 to about 10.

85. (new) The gasket of Claim 82 wherein said shape factor is from about 0.2 to about 10.

86. (new) The gasket of Claim 70 wherein said adhesive layer comprises a pressure sensitive adhesive.

87. (new) The gasket of Claim 70 wherein said elastomeric member comprises a self-bonding elastomer which bonds to said carrier member during said reaction curing without benefit of a previously applied primer coating onto said first side of said carrier member.

88. (new) The gasket of Claim 70 wherein said elastomeric member is reaction cured from elastomer precursor polymer cured by any of an addition-ion process, an ultraviolet light catalyzed process, an infrared radiation catalyzed process, a condensation process, and a free radical process.

89. (new) The gasket of Claim 70 wherein said adhesive is any of a silicone based adhesive, an acrylic based adhesive, a butyl based adhesive, a polyvinyl acetate based adhesive, and a polyether silicone based adhesive.

90. (new) The gasket of Claim 70 wherein said elastomeric member is reaction cured from a polymer selected from the group consisting of silicone polymer, fluorosilicone polymer, butyl polymer, fluorocarbon polymer, ethylene acrylate polymer, polyacrylate polymer, fluoropolymer, isoprene polymer, epichlorohydrin polymer, EPDM polymer, nitrile polymer, HNBR polymer, TPE polymer, and TPV polymer.

91. (new) The gasket of Claim 70 wherein said elastomeric member is reaction cured from self-bonding elastomer, said self-bonding elastomer selected from the group consisting of silicone self-bonding elastomer, fluorosilicone self-bonding elastomer, butyl self-bonding elastomer, fluorocarbon self-bonding elastomer, ethylene acrylate self-bonding elastomer, polyacrylate self-bonding elastomer, fluoropolymer self-bonding elastomer, isoprene self-bonding elastomer, epichlorohydrin self-bonding elastomer, nitrile self-bonding elastomer, EPDM self-bonding elastomer, and HNBR self-bonding elastomer.